UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 58525

CSAH NO. 46

OVER THE

KETTLE RIVER

DISTRICT 1 - PINE COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 58525, Piers 1 and 2, were found to be generally in good condition with no structurally significant defects observed. Each of the concrete columns exhibited minor scaling from the waterline to 1 foot below. A minor scour depression has exposed the top of the footing at the upstream end of Pier 1. Scour depressions were also observed at each of the columns at Pier 2 with the largest present at the upstream column. The channel bottom appeared stable with only the minor scour depressions detected around the piers.

INSPECTION FINDINGS:

(A) The concrete columns exhibited light scaling from the waterline to 1 foot below the waterline with up to 1/8 inch of penetration.

(B) A scour depression, measuring 3 feet in radius and 1 foot deep, was observed at the upstream end of Pier 1. The scour depression has exposed the top of the footing at the upstream end of the pier with no vertical face exposure observed.

(C) A scour depression, measuring 6 feet in radius and 2 foot deep, was observed at the upstream column of Pier 2 with scattered 1 foot diameter riprap in the bottom of the depression. In addition, scour depressions, measuring 1.5 feet in radius and 1 foot deep, were observed at each of the three downstream columns of Pier 2.

(D) An area of poorly consolidated concrete was observed 3 feet above the waterline on the second column from the upstream end of Pier 2 and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration.

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 58525

Feature Crossed: The Kettle River

Feature Carried: CSAH No. 46

Location: District 1 - Pine County

Bridge Description: The superstructure consists of three spans of pre-stressed concrete beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers, all founded on steel H-piles. The piers are numbered 1 and 2 starting from the west end of the structure.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker

Dive Team: Clayton G. Brookins, Michelle D. Koerbel

Date: November 3, 2002

Weather Conditions: Sunny, ±30^{o} F

Underwater Visibility: ±3 foot

Waterway Velocity: ±0.5 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consist of four reinforced concrete columns, which are connected by a 15 foot high concrete webwall above the waterline. The columns rest on a rectangular concrete footing that is founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 4.9 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the concrete column at the upstream end of Pier 1.

Water Surface: The waterline was approximately 24.1 feet below reference. Water Elevation = 1055.1.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

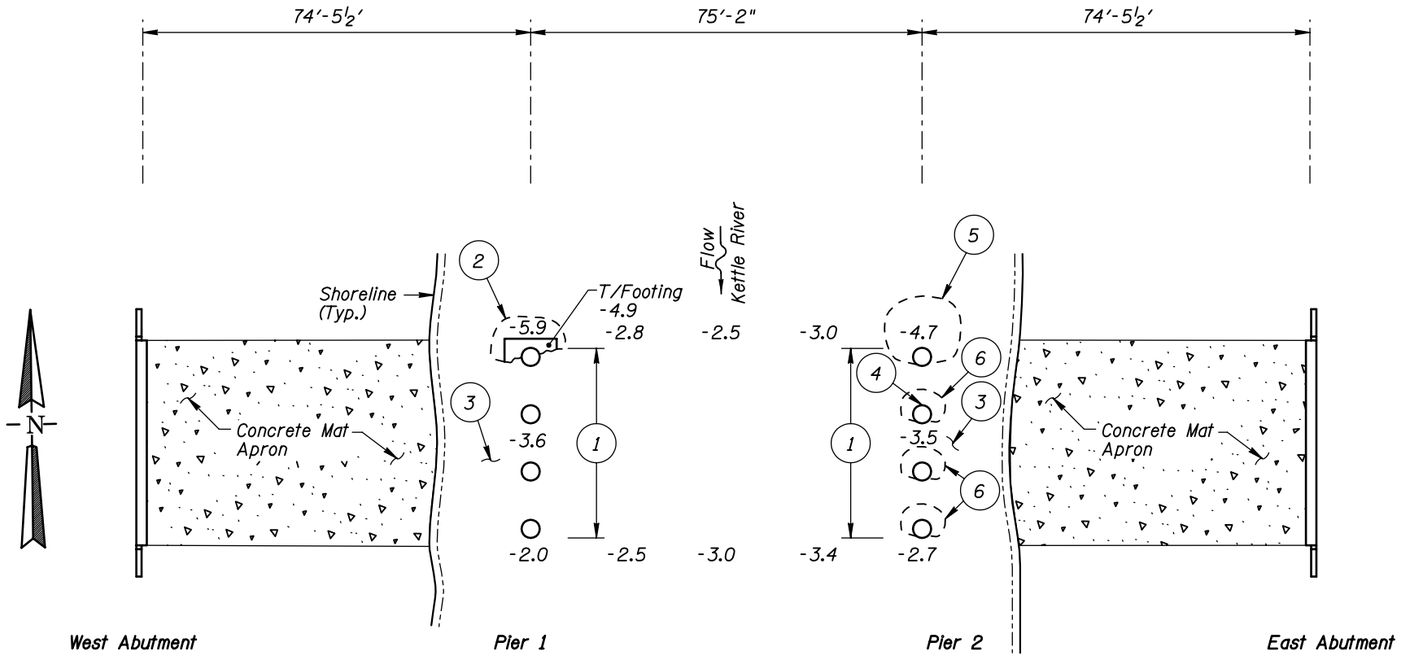
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/11/02

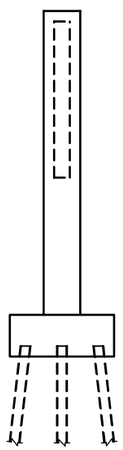
Item 113: Scour Critical Bridges: Code I/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes _X_ No



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on November 3, 2002, the waterline was located approximately 24.1 feet below the top of the concrete column at the upstream end of Pier 1. This corresponds with a waterline elevation of 1055.1 based on design drawings.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The concrete columns exhibited light scaling from the waterline to 1 foot below the waterline with up to 1/8 inch penetrations.

(2) A scour depression, measuring 3 feet in radius and 1 foot deep, was observed at the upstream end of Pier 1. The scour depression has exposed the top of the footing at the upstream end of the pier with no vertical face exposure.

(3) The channel bottom consisted of sandy gravel with cobbles up to 6 inches in diameter.

(4) An area of poorly consolidated concrete was observed 3 feet above the waterline and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration.

(5) A scour depression, measuring 6 feet in radius and 2 foot deep, was observed at the upstream end of Pier 2. Scattered 1 foot diameter riprap was observed in the scour depression.

(6) Scour depressions, measuring 1.5 feet in radius and 1 foot deep, were observed at each of the three downstream columns of Pier 2.

Legend

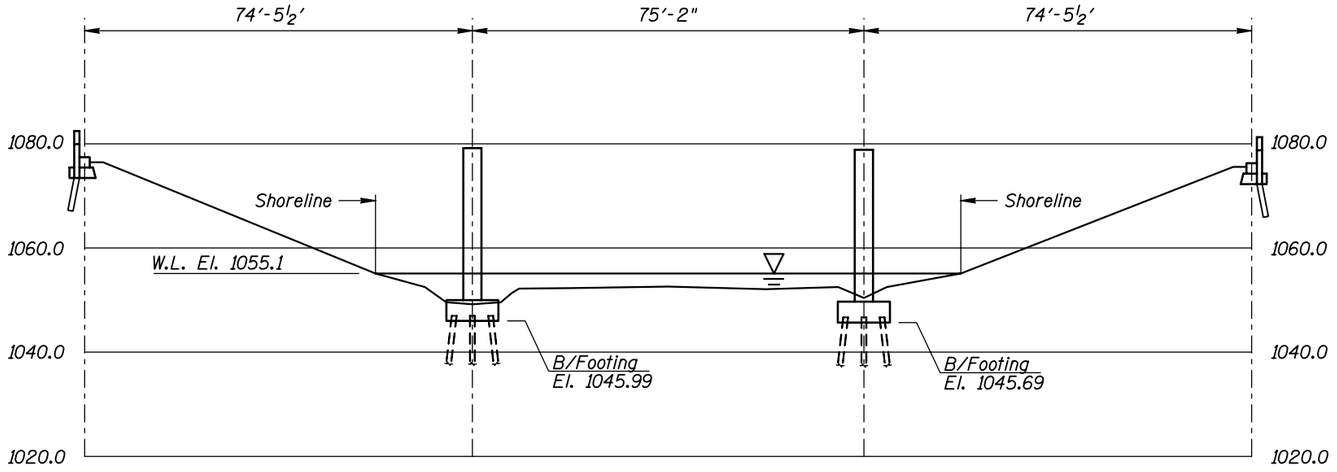
-5.2	Sounding Depth from Waterline (11/3/02)
( )	Scour Depression

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

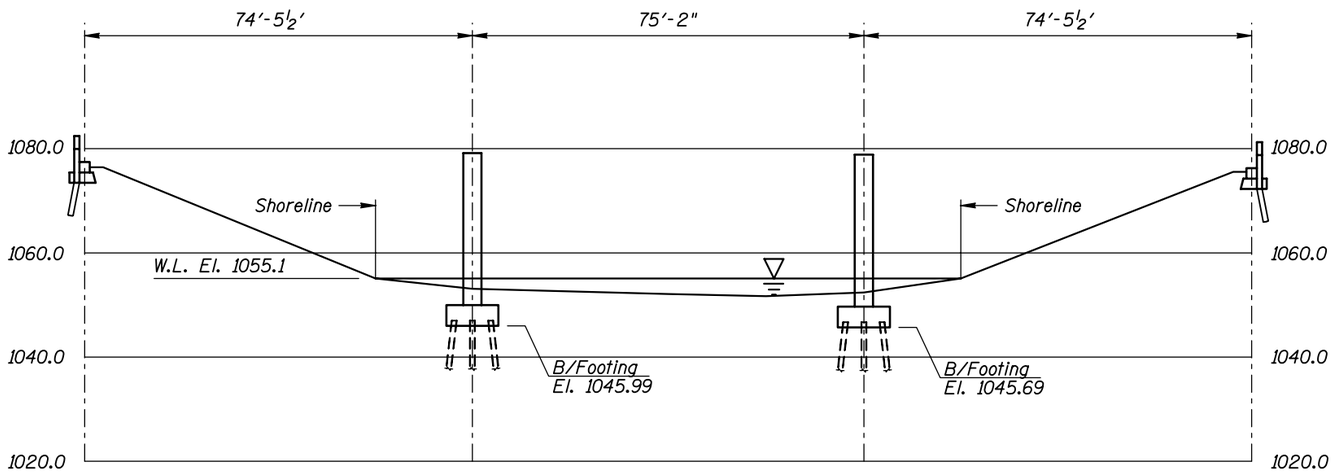
STRUCTURE NO. 58525
OVER THE KETTLE RIVER
DISTRICT 1, PINE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: NOV. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 351258525		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 58525
OVER THE KETTLE RIVER
DISTRICT 1, PINE COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: NOV. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=30'
Code: 351258525		Figure No.: 2

Photograph 1. View of Structure, Looking South.

Photograph 2. View of Pier 1, Looking Northwest.

Photograph 3. View of Pier 2, Looking Southeast.

Photograph 4. Overall View of East Abutment, Looking Southeast.
Typical of Both Abutments.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: November 3, 2002

ON-SITE TEAM LEADER: Shirley M. Walker, P.E.

BRIDGE NO: 58525 WEATHER: Sunny, "30° F

WATERWAY CROSSED: The Kettle River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Clayton G. Brookins, Michelle D. Koerbel

EQUIPMENT: SCUBA, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 8:00 A.M.

TIME OUT OF WATER: 8:30 A.M.

WATERWAY DATA: VELOCITY "0.5 fps
VISIBILITY "3 feet
DEPTH 4.9 feet maximum at Piers 1

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the submerged concrete was found to be in good condition. Each of the concrete columns exhibited minor scaling from the waterline to 1 foot below the waterline. A scour depression measuring 3 feet in radius and 1foot deep has exposed the top of the footing at the upstream column of Pier 1 with no vertical face exposure observed. A scour depression, measuring 6 feet in radius and 2 foot deep, was observed at the upstream column of Pier 2, and scour depressions, measuring 1.5 feet in radius and 1 foot deep, were observed at each of the three downstream columns of Pier 2. An area of poorly consolidated concrete was observed 3 feet above the waterline on the second column from the upstream end of Pier 2 and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 58525
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Kettle River

INSPECTION DATE November 3, 2002

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	4.9’	N	7	8	9	N	7	6	N	8	N	6	7	N	N	N	N	N
	Pier 2	4.7’	N	7	N	9	N	7	6	N	8	N	6	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged concrete was found to be in good condition. Each of the concrete columns exhibited minor scaling from the waterline to 1 foot below the waterline. A scour depression measuring 3 feet in radius and 1foot deep has exposed the top of the footing at the upstream column of Pier 1 with no vertical face exposure observed. A scour depression, measuring 6 feet in radius and 2 foot deep, was observed at the upstream column of Pier 2, and scour depressions, measuring 1.5 feet in radius and 1 foot deep, were observed at each of the three downstream columns of Pier 2. An area of poorly consolidated concrete was observed 3 feet above the waterline on the second column from the upstream end of Pier 2 and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.